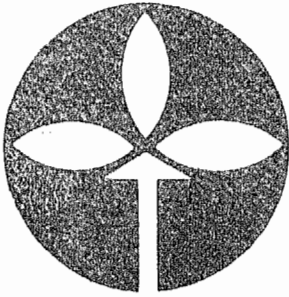


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DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA

Agronomy Branch Report

COPING WITH CHANGE

A Report on the Branch Conference,
1st - 4th April, 1974

Compiled by:

N.R. Matz,
District Agronomist.

D.E. Swincer,
Research Officer (Entomology)

Report No. 55

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COPING WITH CHANGE - A REPORT ON THE

AGRONOMY BRANCH CONFERENCE

SESSION I: 1ST APRIL, 1974

OPENING REMARKS

A.F. Tideman,
Chief Agronomist.

The opening of the Conference was staged in pleasant surrounds on the "greens" at the Northfield Research Laboratories. Mr. A.F. Tideman, Chief Agronomist, welcomed all in attendance, particularly the invited guests from sister organisations, e.g. Australian Wheat Board, Australian Barley Board, Waite Agricultural Research Institute, etc., who would be coming and going during the Conference.

He saw the Conference as an important time for Agronomy Branch members in having:-

- * the opportunity to bring up to date technical advances,
- * the opportunity to try and sift out what to do in the future,
- * the opportunity to talk to one another.

NORTHFIELD ANALYTICAL LABORATORIES OF SOILS BRANCH

R.J. French,
Principal Research Officer
(Soils)

Mr. French outlined the work carried out by the Soils Branch. In having a now more sophisticated equipment set-up, staff were able to do more complex work in soil and plant nutrient analyses (e.g. 8-10,000 samples - 20-25,000 nutrient analyses per year).

Work was mainly in the area of research in developing a "data bank" of nutrient concentrations of soils throughout the State. However, samples from advisers and farmers were attended to on request with some reservations.

He made it quite clear that a spot analysis taken in a dynamic situation was only a starting point for future analyses. An inspection of the analytical laboratories followed.

LUCERNE BREEDING PROGRAMME

I.D. Kaehne,
Research Officer (Plant
Breeding)

Mr. Kaehne brought to the attention of all his lucerne breeding programme.

Objectives included:-

- * Hay yield comparisons between "lines" from overseas (e.g. India, Russia, Portugal) and Hunter River.

Work to date indicated gains in favour of the overseas lines.

- * Tolerance to flooding comparisons.
- * Breeding lines both tolerant to flooding and returning high hay yields.
- * Persistence under continuous grazing comparisons.
- * Resistance to Sitona weevil comparisons. Of more than 50,000 plants tested, only about 12 had shown a reasonable tolerance.

A field inspection followed.

PATTERNATOR DEMONSTRATION

J. Miles,

Murdinga Agricultural Bureau

Mr. Miles, a member of the Murdinga Agricultural Bureau, then spoke about and demonstrated a "Patternator", a device set up by members of the Bureau with the help of an officer from the Department of Agriculture, to determine the "evenness of the fan" for various crop spraying systems.

Conclusions (ex Murdinga group) were:-

- * Careful calibration in itself would not necessarily guarantee an even coverage of spray.
- * A poor spray pattern could usually be detected by the way the spray left the jet.
- * Recommended heights were usually too low.
- * Jets had to be at an angle of 15° .
- * Brass jets appeared to be less efficient than plastic ones.
- * Jets needed to be carefully inspected prior to purchase.

SESSION II: 2ND APRIL, 1974

ADMINISTRATION & DIRECTIONAL POLICIES

H.P.C. Trumble,

Assistant Director of Agriculture
(Administration)

Mr. Trumble spoke on three important areas of change for the Department of Agriculture:-

- * The relocation of the Agriculture Department at Monarto, Parafield and Northfield Centres included. Adelaide based services were possible exceptions (e.g. fruit fly, animal quarantine).
- * The up-dating of the present headquarters. It appeared that a "set" amount of money would be provided by the Government to up-date the interior of the Agriculture Department building. Naturally it could not be expected to be too great in the light of the move to Monarto.
- * The Callaghan Report. At this stage little could be said other than to report that there appeared to be a major emphasis on regionalisation.

REVIEW OF CURRENT CHANGES IN AGRICULTURAL TECHNOLOGY

S.G. Williams,

Assistant Senior Agronomist

1. Introduction:

Since the turn of the century there has been tremendous changes in agriculture.

These rapid changes mean that both the farmer himself and those servicing primary industry must constantly review the existing situation and prepare for likely developments in the future. Broadly speaking, changes in agriculture can be divided into four categories:- production, economic, technical and environmental, each of which is inter-related. Let us look briefly at some of the changes that have recently taken place in each of these categories.

2. Production:

2.1 Wheat

During the last five years we have gone from a surplus production of wheat which brought about the introduction of wheat quotas, to a shortage resulting in a relaxation of quotas and record prices for the 1973 crop.

In 1968 we produced the record wheat crop for South Australia, nearly 2.3M. tonnes, and in 1960 we obtained the record yield per hectare with 1.58 t/ha.

2.2 Barley

During the past two seasons barley sowings have shown a decline in favour of wheat but the prices received for barley, particularly for the 1973 crop, showed a substantial upward trend. Record production for barley was obtained in 1971 - 1.0M. tonnes and record yield per hectare, 1.58 t/ha in 1958.

2.3 Oats

Compared with wheat and barley, oat area and prices have remained fairly static. The record production for oats was reached in 1958 - 218,000 tonnes, and a record yield per hectare in the same year being 1.12 t/ha.

2.4 Minor Crops

When wool prices had slumped, beef cattle were expensive to switch to and wheat quotas were introduced, considerable interest was shown by farmers in growing minor crops for an alternative source of income. Originally emphasis was placed on growing oil seed rape and a little later lupins, sunflower, and to a lesser extent safflower entered the field. Interest was also shown in expanding the area own to linseed in the South East. Although the market price of these crops has increased each year, there has not been a corresponding increase in sowings due to the recent profitability of wheat, barley, beef cattle and sheep enterprises. At the present time minor crops with the possible exception of lupins, appear to be developing into a specialised industry, particularly in the South East. One of the most important reasons is that most of the minor crops require a minimum annual rainfall of 41 cm or more or in the case of sunflowers, irrigation.

However, lupins as a grain protein and soil fertility building crop have been more widely grown and the area sown is expanding more rapidly than most other minor crops.

2.5 Vines

There has been a spectacular expansion in vineyard plantings during the last six or seven years. Plantings have now reached over 29,500 hectares, an all time record. Due to a labour shortage, grape growers are being forced to consider mechanisation of harvesting operations.

2.6 Almonds

South Australia has always been the most important almond growing state and interest in almond culture has accelerated, particularly in the Northern Adelaide Plains, during the last few years. Record almond production of 1,501 tonnes was reached in 1972.

2.7 Vegetables

Due to housing development in suburban Adelaide, vegetable production is gradually being pushed out of the metropolitan area, notably Paradise, Athelstone, Plympton, Fulham, etc., and production is limited by water availability in the Virginia area.

Vegetable production has expanded in the irrigated Murray River districts and in the South East. Growing vegetables under contract to package processors has developed in the Lower South East but influenced by the profitability of other enterprises a temporary decline in this specialised form of production has taken place during the last two years.

2.8 Sheep

Under the influence of low wool prices and the profitability of beef cattle, we saw a decline of over 4 million sheep in the three years to March, 1973. There were nearly 20 million sheep in South Australia in 1970, a record number, and only 15.5 million as at March, 1973. Since this period there has been an upward trend due to a recovery in wool prices and a steady demand for sheep meat.

2.9 Dairy Cattle

Dairy cattle numbers have shown little variation over the past five years, but there has been a trend towards fewer producers and larger herds.

2.10 Beef Cattle

Beef cattle numbers, now a record 1.36 million, have doubled in the past five years.

2.11 Pigs

The profitability of the pig industry in recent years is shown in the numbers reaching a record 499,000 in 1973.

2.12 Poultry

Because of the difficulty in disposing of surplus eggs proposed legislation is likely to restrict laying hen numbers to 1.18 million, and also limit the size of single units in South Australia. The broiler industry is mainly controlled by large commercial interests and expansion is keeping pace with demand.

2.13 Rural Holdings

In 1971-72 there were 247,600 rural holdings of 0.4 hectares or more in Australia. The number of rural holdings is declining, gradually reflecting a continuing trend towards increased size of individual farms.

Although this trend is also apparent in South Australia, the true picture is being clouded by resubdivision which is taking place, particularly in the Adelaide Hills and adjacent areas. Resubdivision has resulted in more farms in this area with many individual farms of 4 to 12 hectares.

3. Economic:

A comparison of the gross value of rural production for selected agricultural produce in the two seasons 1970-71 when we were in the midst of a rural crisis, and in 1973-74 when a dramatic improvement in prices took place is of interest.

Gross Value of Rural Production Australia

	1970-71 \$M.	1973-74 (Estimated) \$M.
*Wheat	403.6	1,056.0
Barley	110.8	180.0
Oats	54.3	53.7
Vegetables	165.1	206.0
Fruit	223.1	247.5
Wool	537.5	1,277.0
Sheep slaughtered	178.4	295.0
Cattle slaughtered	642.3	1,280.0
Pigs	105.0	152.0
Eggs	82.7	105.0
Whole milk for human consumption	170.5	199.3

(B.A.E. Report F. & G. 7/2/74)

* It is estimated that Australian wheat growers will get a record return of about \$10 per tonne (\$2.75 per bushel) for wheat delivered to the 1973-74 pool.

The annual growth of farmers' income 1962 to 1973 was 3.4% but the annual growth of income of other wage earners for the same period was 7.2%.

The annual growth of gross farm produce 1963 to 1972 was 4.1% and the annual growth of non-farm produce during the same period was 3.1%.

Along with general price rises, significant price rises of agricultural items have taken place, some of which include machinery, fencing materials, building materials and agricultural chemicals.

In most cases the main farm annual expense is fertilisers. The proposed removal of the superphosphate bounty and the additional cost of rock phosphate along with expected increases for shipping freight, sulphuric acid and handling costs, could increase the cost of superphosphate by more than \$22 per tonne. Shortages in such items as fencing materials, machinery and building materials, herbicides, pesticides and farm labour, have already added to the problems of the farmer.

4. Technical:

We have seen many notable changes in this field.

4.1 Wheat

Halberd, a Roseworthy wheat bred by Mr. Rex Krause and released in 1969, accounted for 55% of total wheat area sown in South Australia in 1973. Halberd has resulted in a big lift in yield per hectare and overall production.

Another very significant step which was taken in 1971 was to make recommendations for zones based on protein levels.

4.2 Barley

Probably the most outstanding event was the phasing out of Prior and the introduction of Clipper which was released from the Waite Agricultural Research Institute in 1968. As from 1973-74 season, Clipper will be the only variety accepted in the malting and No. 3 grades, as overseas buyers of malting barley have shown a strong preference for Clipper.

4.3 Forage Crops

The introduction of hybrid forage sorghums, notably Sudax, greatly improved the production of forage crops, especially under irrigation.

4.4 Medics

The introduction of Jemalong barrel medic and Harbinger strand medic meant that annual medics could be extended into areas unsuited to Hannaford medic, which had been the standard cultivar for many years.

The "king of fodders" lucerne, a perennial medic, is still as popular as ever. In spite of many new introductions coming on to the scene, Hunter River, although a very mixed cultivar, is still the most favoured both for dryland and irrigation. The Parafield selection from African made by Mr. E.J. Crawford, although not yet fully tested, appears to be the greatest threat to Hunter River of any cultivar tested so far.

4.5 Clovers

Subterranean clover cultivars have been popping up in consistent regularity.

In the high rainfall areas there is still nothing to better the original Mt. Barker but relatively new introductions, such as Woogenellup and Seaton Park, have filled many gaps.

Yarloop the most outstanding cultivar for waterlogged soils, has gone into disgrace on account of its high oestrogen content and associated lambing problems and its susceptibility to Kabatiella clover wilt disease.

Maral Giant Shaftal clover, an introduction from Portugal, has proved to be of considerable value as an annual forage legume under high rainfall and irrigation.

4.6 Grasses

The most noteworthy grass introduction in recent years has been Currie cocksfoot. Its ability to thicken in a sward and produce on a wide range of soil types is outstanding.

After being disregarded for more than thirty years, Demeter fescue has gained considerable popularity during the last five or six years as a pasture grass in high rainfall areas and under irrigation. It is also one of the most salt tolerant species available.

Tamar ryegrass is proving its worth, often mixed with Maral shaftal clover, as an annual autumn sown forage plant. Ariki ryegrass from New Zealand has now become a standard recommendation in irrigated pasture mixtures.

4.7 Specialised Agricultural Industries

Probably the most outstanding specialised agricultural industry in recent times has been the development of the broiler chicken industry. Starting from scratch some fifteen years ago, it has now developed into a multi-million dollar industry. We are also hopeful that the oil seed crushing plant being developed at Nairne will become a profitable primary industry for South Australia.

4.8 Changed Methods in Agriculture

The introduction of the boom spray, together with the development of hormone-type herbicides such as 2,4-D, revolutionised weed control in cereal crops. Since the introduction of 2,4-D soon after the last world war, more specialised herbicides have come on to the market in frequent succession.

Some other changes include chemical ploughing and sod seeding, "Spray-Graze", "Spray-Seed"(R) and biological control of skeleton weed with rust, mites and midges.

4.9 Machinery

Since the introduction of equipment to handle wheat in bulk, bulk handling equipment developed at a rapid rate. Bulk handling is now the most common method of handling many agricultural products, including grains of most types, fruit, vegetables and even milk. Some of the main developments which have taken place in recent years with the trend towards larger farms, has been the use of large tractors, wide cultivating machinery and self-propelled headers. The conventional sickle mower is now meeting strong competition from the rotary type slashers and mowers. The forage harvester has also largely replaced the mower and buckrake for handling green fodder.

Fodder conservation methods have changed. In many instances the common rectangular bale has given way to fodder rolls and more recently, to mini-hay stacks. Processed feeds have developed from meals and mashes to pellets and cubes and so one can go on almost indefinitely.

5. Environmental:

The seasonal rainfall pattern as is well known, can change dramatically from year to year. This forms part of our environment and is one factor over which we have little control.

The effects of the weather in recent times have been responsible for a number of outbreaks of insect pests and diseases.

5.1 Insect Pests

Pasture cockchafer outbreaks have occurred during the last three years with damage, particularly in the Adelaide Hills, increasing each year.

Sitona weevil was first recorded in South Australia in 1966 and it had spread to all parts of the agricultural areas by 1971. The adults being foliage feeders of legumes and the larvae feeding on the nodules of annual legumes were looked upon as the biggest threat to pastures from an insect, seen for a long time. The lean year of 1972 reduced populations to a low level and few areas where serious damage has occurred have been reported since 1972. Plague locust numbers influenced by suitable weather conditions in the outback have built up in number during the last two years and widespread activity is still apparent.

Dung beetles were first released in South Australia in August, 1972 as a means of reducing dung accumulation on pastures, and increasing soil fertility, and most of all, to aid in the control of bush flies, parasites and stock diseases.

Seven outbreaks of fruit fly have been isolated in the metropolitan area this summer. The highest number of outbreaks ever recorded in the State. This sudden flare up of fruit fly is thought to be largely due to the unusually humid summer weather experienced this year.

5.2 Diseases

Stem rust which ravaged the wheat crops of last harvest was probably the worst outbreak of rust ever recorded in this State. High spring and summer rainfall was responsible. Since 1968 the fungal disease, Kabatiella, has been an increasing problem on Kangaroo Island and elsewhere in the State. It has caused the most serious losses on Kangaroo Island where Yarloop, the most susceptible cultivar, is the dominant species on many properties.

5.3 Pollution

The pollution of animal produce by chemical residues has meant the replacement of many chemicals used in agriculture so as to conform with world standards which have been set for maximum allowable tolerances.

The initial replacement was trichlorophon for DDT and more recently new grain pickles, such as Mankobunt, to replace Hexabunt.

Other pollution regulations which have been introduced include the zoning of certain types of agriculture in water catchment areas, A.P.P. alerts in the metropolitan area and the restricted use of certain herbicides to prevent off-target damage to horticultural crops.

FUTURE CHANGES IN AGRICULTURAL TECHNOLOGY

A.F. Tideman,
Chief Agronomist

It is difficult to predict future developments. The exercise of draining the South East, while highly successful in terms of agricultural production, should never again be carried out without a full environmental impact study. Obviously, we need to plan and co-ordinate our work today with sociologists, economists, industrialists, ecologists and so on. At present we are at least attempting to break down this aspect of working in isolation.

An unofficial register of ecologists in Australia lists only 35 true plant ecologists, so that this could place serious limitations on the future development of agronomic techniques.

With the use of the herbicide 2,4,5-T, the now so-called environmental crisis, and the DDT story, even Frank Pearson's prediction some eight years or so ago that technical changes would bring cereal yields in the good years of at least 65M. bushels by 1975, was exceeded by about 20M. bushels in 1969. This all points to the fact that in dealing with changing technology, the best predictions will probably be wrong and flexibility must remain our key word.

1. Developments in Computer Science:

Until recently, the development of complete crop production systems in applied research has been hindered by the inadequacies of the conventional field experiment, such as the statistical differentiation of treatment effects in situations where site by season inter-actions only account for 88-90% of the total variance. However, the development of computer technology has rectified the situation as Henry Nix in the C.S.I.R.O. Division of Land and Research is demonstrating. This computer information combined with the satellite camera and economic data, will enable us to quantify a particular crop, evaluate its worth, thus making it possible to optimise land use for a specific area.

This Department has already been offered such a system through the Economist's Intelligence Unit Ltd., who are providing this service as a part of the Skylark Programme and who have already done some of the ground work with our field officers.

2. Developments in Protein Technology:

Growing affluence in many countries has caused a protein crisis where a food crisis hasn't existed. Inflation has brought about restraints and the need for cheaper alternatives. The meat pie in London is one such situation, where now an alternative in pies made from textured vegetable protein can be purchased for half the price.

Soybeans has been the seed most commonly used for simulated meat products. These products are quite important for a number of reasons. It is more efficient to convert vegetable protein into human food through a factory process than by means of animal digestion and re-synthesis to muscle in the animal. Proteins of vegetable

origin allow controlled engineering of food to conform with optimum nutritional requirements, such as the control of fat and calorie content. They are also free of cholesterol and low or free from saturated fatty acids. Proteins of vegetable origin make possible continuing quality control in their manufacture, and when it comes to cooking them, there is no waste.

Wheat and broad beans have more recently been developed on a commercial scale to provide protein in Japan and the United Kingdom.

Other vegetable proteins derived from tobacco leaf and fungal yeast and bacterial fermentations will no doubt be used for human consumption in the future as they are perfected.

The Plant Industry Division of C.S.I.R.O. is concentrating on the control of storage protein synthesis in developing grain legumes and pulse seeds. The Food Research Division is looking at other vegetable materials than soybeans as a source of protein. The Protein Chemistry Division is also studying vegetable protein from sources capable of being produced in Australia. With lupins, they propose to study the aggregation of the protein, following fractionation, their dis-aggregation into sub-units, also their physio-chemical properties and amino-acid composition and sequence.

Our Department needs to do more work in this field. We can only claim to this time one man year of work. Victorian can claim $5\frac{1}{2}$ man years while Western Australian can claim 14.

3. Developments in Genetics:

Tremendous advances have been made in this field. The understanding of the biochemistry of the living cell and its genetic implications is daily being elucidated, so that it appears that nuclear transplants are not too far away enabling features to be added to a plant or organism without the need for genetic crossing. Already the degree of chromosome manipulation is quite staggering.

Dr. Max Whittens' work on the sheep blow fly (*Lucilia cuprina*) on genetic manipulation at the displacement of field populations with strains of flies carrying conditional lethal mutations is an excellent example of what we can expect in the future from genetics.

4. Developments in Crop Loss Assessment:

There is a growing realisation of the importance of crop loss assessment and attempts are being made to co-ordinate the work across the world. The Plant Production and Protection Division of F.A.O. is one such organisation to have recently brought together the general guiding principles covering this work. Changing cultural and climatic conditions would certainly have some effect on applying these principles as such, but they would nevertheless serve as a good guideline for problem evaluation.

5. Conclusions:

Agricultural technology has always had a bright future. As the community as a whole comes to realise this fact, it is hoped that those responsible for many aspects of changing technology in agriculture will be flexible enough to work with the planners, the engineers, the social workers, and so on. If not, we may all be hungry.

AUSTRALIA'S RURAL MARKETS - A VIEW BEYOND THE MID-1970'S

K. Anderson,
Agricultural Economist

1. The Present Boom:

The short term rural outlook is extremely bright, with wool, meat, grains and oil seed prices remaining high during 1974, even though below the peaks of 1973. This is due to a coincidence of poor seasons in major producing countries in 1972 with strong demand in developed countries as a result of real economic growth in 1972 and 1973. However, these are only short term factors, and already there are signs of rapid production increases (U.S. crops expanded 10 million hectares in 1973 and could expand a further 8 million hectares in 1974), while demand is slackening because of a slow-down in the rate of economic growth (due to inflation, energy crisis). Thus prices won't remain high much beyond 1974.

This sort of turn-around due to short term factors will go on ad infinitum. Therefore we need to look at the longer term trends in rural markets.

2. Domestic Market Outlook:

This is likely to expand with population growth by 40 per cent between now and 1990. Thus overall rural production to meet domestic demand in 1990 will amount to about two-thirds of total current production. As incomes rise people will tend to use less bread, mutton and butter and more beef and veal, poultry, pig meat, feed grains, vegetable oils, fresh fruit, cheese and of course, wine. Other commodities such as lamb, wool, canned fruit and fresh milk are not likely to be affected by changes in income.

3. Export Market Outlook:

Demand for Australia's rural exports depends largely on world population, which is projected to increase by almost 2 billion in the next twenty years, an increase of 50 per cent over the present population. It may therefore be tempting to conclude there will be huge markets for Australia's rural products in the years ahead. Indeed, many "doomsday" men have predicted future mass starvation, with the present shortages being only the beginning (Paul Ehrlich (1968) *The Population Bomb*; W. & P. Paddock (1968) *Famine - 1975!*; R. Damond & B. Rosier (1969) *The Hungry Future*).

There are wide differences of opinion on whether we will be able to feed the world's exploding population (compare P. & A. Ehrlich (1972) *Population Resources, Environment: Issues in Human Ecology* with John Maddox (1972) *The Doomsday Syndrome*). Their respective arguments are summarised in the March, 1973 issue of *Current Affairs Bulletin*). At least over the last two decades the growth in agricultural production exceeded population growth. Proponents of mass starvation, like Malthus 150 years earlier, place too much emphasis on the role land as such plays in agricultural production, and too little emphasis on the capital and technology applied to that land. Colin Clark (in *Starvation or Plenty* (1970)) suggests

that with existing technology we can feed ten times the present population at U.S. consumption standards. (The world's potentially arable land is about 3.2 billion acres, some three times the present annual harvested area). On the other hand, we should not under-estimate the enormous food distribution problems that exist. But these are social and political problems of poverty, which will need to be overcome long before food production becomes a limiting factor.

Effective export demand is what farmers are seeking, that is, the desire to buy coupled with the ability of the market to pay at least the cost of production. Significant effective market growth cannot be expected in developing countries until there are (1) substantial income rises, and (2) a more even distribution of wealth. Higher income countries (western Europe, the U.S. and Japan) will continue to provide our major export markets, with consumption trends similar to those in Australia. The expected increase in per head red meat consumption will boost demand for livestock feed. Perhaps this suggests we should place a strong emphasis on developing better varieties of feed grain and oil seeds.

3.1 Trade Restrictions

Most countries are aiming at self-sufficiency in rural products often with the aid of trade barriers to restrict imports and price support schemes are used to encourage their own producers. If these policies are successful, Australia's rural export demand will diminish in the future.

3.2 Synthetics

Wool markets will continue to be affected by competition from synthetic fibres (despite their increased production costs because of the energy crisis), especially while wool prices are fluctuating so much and at high levels. Meat substitutes at present only take 1 per cent of the U.S. meat market, but the U.S.D.A. expects their share to increase to between 4 and 8 per cent by 1980, most of which would be taken from the manufacturing beef markets which our exports supply. Petroleum or starch-based single cell protein may also affect crop farmers, in so far as it is used for stock feed (and in meat substitutes for human consumption?) in place of oil seed meal.

3.3 Rural Policy Changes

The G.A.T.T. negotiations later this year will attempt to make world agricultural trade freer, which should open more markets for our exports. The World Food Conference in Rome in November hopes to develop a world food storage programme to help stabilise prices. Australia's new wheat stabilisation scheme and the proposed wool marketing scheme are not likely to bring immediate relief to the unstable world prices, even though they may in the longer term.

3.4 Unstable World Prices

Prices will continue to be unstable because of the relative insignificance of world agricultural trade. (Only 10 per cent of meat and coarse grains and 15 per cent of the world's wheat production enters world trade. The U.S. can cause the world coarse grains trade to almost halve simply because of a seasonal shortfall of 10 per cent in their country). Prices will be even more unstable in future because (1) increasing inter-dependance between feed grains,

oil seeds and meat; (2) U.S. and Canada recently decided to hold less stocks; (3) U.S.S.R. apparently is going to import rural products in poor seasons rather than force people to "tighten the belt", and (4) the monetary crisis is leading international investors to hedge more with commodities rather than currencies. This greater price instability means farmers have to diversify more, suggesting the development of alternative minor crop varieties should be stepped up.

4. Farm Costs, Inflation & the Energy Crisis:

Inflation looks like continuing (13.2 per cent in Australia last year), and will mean higher costs for farmers, and a reduced spending power of net income.

The energy crisis is also affecting costs. Oil prices trebled in 1973, making (1) petroleum-based nitrogenous fertilisers dearer and in short supply; (2) shipping freight costs higher (rates between Australia and the U.S. trebled in 1972), adding to the cost of exporting. Shortage of nitrogenous fertilisers is causing other fertiliser prices to rise (Moroccan phosphate rock trebled last January). Cost increases mean that individual farmers will need a bigger resource base, that is they will need to invest more capital and technology and/or buy more land. This pressure is accentuated by recent removal of subsidies to Australian farmers.

5. To Sum Up:

- * Domestic markets will increase at the same rate as population.
- * Traditional markets in high income countries will continue to take the bulk of our exports.
- * To the extent that trade restrictions make these and the centrally planned countries self-sufficient in rural products, Australia's exports will tend to increasingly fill the gaps in the ups and downs of rural markets.
- * Farm prices will be more unstable, so farmers will need to diversify more to hedge against fluctuations.
- * The massive poverty problems of the developing countries will prevent most of their food needs being made effective in international markets.
- * Ultimately, while the agricultural sector will remain a significant industry in Australia, the individual farmer will need to either continually diversify and increase his resource base to maintain his standard of living, or leave the industry.

FARM POLICY IN AUSTRALIA - IMPLICATIONS FOR THE FUTURE

R.K. Hefford,
Senior Lecturer in Economics,
University of Adelaide

In the early 1950's, a sharp fall in wool prices led to a balance of payments deficit. Import restrictions were imposed and the Liberal-Country Party Government initiated numerous courses of action (such as tax concessions, easing of credit restrictions, steps to increase supplies of farm requisites and increased allocations for research and extension) designed to provide incentives to, as well as the means of, increasing farm production and exports. These measures contributed substantially to the subsequent increase in farm output.

The economic circumstances of the 1960's were different in many ways. For example, the competitive position of synthetic fibres had improved tremendously; the U.S. was fast unloading its farm surpluses (particularly grains) in developing countries; Britain was seeking entry into the Common Market (posing a threat particularly for our dairy products and canned fruit) and growing exports of minerals and manufactured goods were contributing increasingly to balance of payments surplus.

But the Commonwealth Government continued to encourage farm investment and output. Continuation of the cost-of-production arrangement for wheat (while other farm product prices were stationary or falling) led to a sharp switch into wheat and introduction of the economically inefficient production quota solution to the surplus of 1968-69. Despite the recommendation of the Dairy Industry Committee of Enquiry that the subsidy to that industry should be phased out, the subsidy was maintained throughout the sixties and increased substantially in 1970-71, despite Government recognition in that year of a need to limit dairy production and its concurrent introduction of the Marginal Dairy Farms Reconstruction Scheme. But the bulk of direct assistance to both the wheat and dairy industries accrued to the relatively few big producers generally least in need. Meanwhile, tax concessions to farmers were not only continued as an incentive to farm investment but extended with the introduction of the Investment Allowance; this allowance, like other tax concessions, resulted in greater absolute benefit, per dollar of investment, the higher the taxable income of the farmer.

Over the period 1966-72, direct annual assistance to the wool, wheat and dairy industries rose from \$56M. to \$197M. Expenditure of four types not specific to individual industries (as indicated in the table provided) increased from \$33M. to \$103M. By 1971-72, revenue foregone as a consequence of tax concessions to farmers amounted to an estimated \$51M. Taking into account other payments not specific to individual farm industries, including payments for extension services and drought relief, as well as part of expenditure on beef cattle, roads and water resource development, assistance to the farm sector in 1971-72 amounted to an estimated \$410M.

After taking office in December, 1972, the Labour Government faced a large surplus in our balance of payments as well as growing inflationary pressure - the latter in part generated by rising Government expenditure in partial fulfilment of pre-election promises. Re-

valuation of our currency, given no other change, meant a decrease in the \$A value of our exports and relatively cheaper imports for Australian consumers. The cross-the-board reduction in tariffs was intended to dampen the increase in local prices in competition with cheaper imports. But the Government still faced limited means at its disposal in relation to its promises to increase certain expenditures, such as on pensions and education.

The Report of the Coombs Committee (mid-1973) suggested a partial and perhaps politically palatable solution. Chapter 2 of that report indicated some of the shortcomings in assistance previously afforded farm industries and suggested that, in view of the marked improvement in outlook, "there are presently a few industries or sectors of industry in which aid is needed". It was suggested, inter alia, that assistance to the dairy industry should be reduced and farm industry stabilisation arrangements, the fertiliser bounty and tax concessions to farmers should be reviewed.

In support of these recommendations, it was asserted (p. 17) that "It is difficult to argue that, in a year when the net farm income of the rural sector is at record levels, direct government assistance . . . is either needed or justified".

Past experience of farm product prices suggests that longer-run policies should not be based on essentially short-run conditions. In fact, prices for some farm products (e.g. wool and beef) have weakened dramatically since the Coombs Report was issued. Nevertheless, it is clear that the Government currently regards that report as its "blueprint".

The wool industry grant for promotion and research has been cut to half the amount allowed for in the Budget; the recently concluded wheat stabilisation arrangement will result in prices much more closely related to world market trends and an upper limit of \$80M. assistance to the industry over the next five years - compared with \$212M. actually paid to the industry over the life of the last five year scheme; the butter and cheese subsidy is to be phased out by the end of June, 1975; depreciation allowances have been reduced from the "special" (20 per cent) rate to generally much lower "normal" rates, the investment allowance has been abolished and capital expenditures (such as involved in clearing scrub and initial sowing down of pasture) are now deductible over ten year periods rather than in the years in which such expenditures are incurred. The bounty on superphosphate, costing the Government about \$58M. in 1972-73, seems certain to be withdrawn completely from December, 1974. Consistent with recommendations of the Coombs Committee, more funds are to be made available for rural reconstruction if the need arises.

These measures alone seem likely to save the Government something like \$140M. in a full year and to increase revenue (by way of additional taxes paid by farmers) by approximately \$30M., relative to 1972-73. Even so, and bearing in mind the currently much higher level of farm income, assistance likely to be offered the farm sector in 1974-75 seems likely to be no less than total assistance afforded by the Liberal Party Government in the mid-sixties.

But the impact of these recent policy measures will not be felt equally by all farmers in all industries. Wool growers are now meeting a greater share of the cost of promotion and research and might become

more critical of the use made of these funds. Meanwhile, given such an "unfriendly act" by the new Government, as well as the traditional resistance of wool growers to Government intervention (e.g. in marketing) will be willingly accepted. The gearing of wheat prices to market signals rather than to domestic costs represents a major break with former policy. Given the new arrangement, growers will probably pay more attention to market prices available for all grains and switch more readily between alternatives. This, in turn, seems likely to impose more pressure on research and extension workers to find suitable varieties for marginal areas and to advise growers who have no previous production experience with respect to oil seeds or non-traditional feed grains. The treatment meted out to the dairy industry seems particularly severe. But the dairy industry has long been the most heavily protected of our farm industries and the subsidy represents only a part of that protection. Nevertheless, the period allowed for adjustment seems unreasonably short and, relative to 1971-72, withdrawal of the subsidy will serve to cut gross revenue on the "average" dairy farm by approximately \$800 in 1975-76. Where dairying is only a sideline activity, there is no reason to expect a change. Further consolidation of smaller dairy farms seems inevitable. But those with large dairy herds will really feel the pinch and will presumably swing more heavily into beef and veal production.

Reduction in rates of depreciation allowable and withdrawal of the investment allowance will mean that a much smaller proportion of the cost of plant, particularly new plant, will be offset by reduction in tax in the year of purchase. In the shorter run, it seems likely that plant will be replaced less frequently, mechanical innovations will be adopted less readily and the substitution of capital and labour will be retarded. In the longer run, farmers might become more receptive to either hiring or joint ownership of plant of types needed only infrequently or for short periods each year. Such a trend should reduce quite substantially the cost of such plant. The new arrangement with respect to capital expenditure will make shorter-run developmental programmes less attractive to "Pitt Street" farmers. Bonafide (resident) farmers will probably be under less pressure to compete with absentees for the services of contractors. But there is now less incentive also to resident farmers to proceed with such development and, to the extent that absentees substitute expert advice for experience, it seems likely that there will be some slowing down in dissemination of improved techniques.

The case for removal of the phosphate bounty is not clear. Farm representatives predict a sharp reduction in the use of phosphate, a sharp reduction in output and in food prices. The price of crude phosphate has recently increased substantially and manufacturers are in the process of raising their prices. So the increase in cost of superphosphate will certainly prove to be more than \$12 per ton. Farmers will use less superphosphate than in the absence of such an increase in price. But how much less? This is not a case for substituting one input for another. On the other hand, are our farmers currently using too much phosphate? Ecologists would assert that this is so. But given the imminent increase in price and the rate at which known reserves of phosphate are dwindling, high priority should be given to a closer examination of the relationship between phosphate applications and yields.

In view of these and other reductions in assistance to the farm sector, it is not surprising that farmers feel that they have been the victims of discrimination. In fact, given also the Government's search for resources to make good its pre-election promises, farmers might be excused for believing that the essence of the exercise has been "to rob Peter to pay Paul". But if we accept the earlier (welfare) argument in support of greater assistance to the farm sector when incomes were falling, we should also accept the argument for reduction in assistance when farm incomes are rising. A case can also be made for drawing off a larger part of this higher income in order to dampen, at least in part, the currently excessive demand for goods and services.

Looking further into the future, we might speculate as to whether the present Government would reverse or modify any of these policies in the event that any farm industry, or the farm sector as a whole, again encountered difficulties. Probably many farmers believe that their future rests heavily on the outcome of the next Federal election. But if a Liberal-Country Party Government is returned, should we assume that all rural policy changes introduced by the present Government will be reversed? Such action seems most unlikely. Wheat prices geared more closely to prices received overseas, substantially less direct assistance to the dairy industry and at least some of the recent amendments to tax concessions available to farmers appear likely to withstand any prospective change in government.

Commonwealth Budget Provisions for Payments To or For the Farm Sector (\$'000)

	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74 (Estimated)
Wool Industry:								
Advances to A.W.C.	-	-	-	-	13,300	-	-11,700	-
Deficiency payments	-	-	-	-	-	52,800	- 1,500	100
Wool marketing assistance	-	-	-	-	2,900	4,100	2,500	600
Promotion & research	10,800	13,000	15,100	13,100	28,200	28,600	36,300) 43,600)?
Emergency assistance to growers	-	-	-	-	21,300	200	-) 22,000)?
	10,800	13,000	15,100	13,100	65,700	85,700	25,600) 44,300)?
) 22,700)?
Wheat Industry:								
Stabilisation payments	16,200	15,500	42,900	-	29,000	58,400	41,400	16,000
Wheat research	800	900	900	900	700	800	1,600	1,600
	17,000	16,400	43,800	900	29,700	59,200	43,000	17,600
Dairy Industry:								
Butter & cheese subsidy	27,000	27,000	27,000	27,000	41,500	39,900	28,500	18,000
Processed products bounty	900	700	600	500	2,700	2,100	900	800
Dairy reconstruction	-	-	-	-	3,100	7,600	2,900	3,100
Dairy research	300	400	300	400	400	400	400) 2,800)
Other expenditure	-	-	-	-	2,200	2,100	2,100) 2,800)
	28,200	28,100	27,900	27,900	49,900	52,100	34,800	24,700
Sum of Three Industries	\$56,000	\$57,500	\$86,800	\$41,900	\$145,300	\$197,000	\$103,400	\$65,000 ?
Expenditure not Allocated to Specific Farm Industries, e.g.								
Currency compensation	-	21,000	35,000	29,000	21,000	7,200	200	-
Phosphate bounty	26,300	23,600	31,700	45,800	40,800	45,800	69,800))
Nitrogen fertilisers bounty	6,700	10,300	11,000	9,900	9,700	9,800)) 61,000)
Rural reconstruction	-	-	-	-	4,000	40,000	50,800	47,200
	\$33,000	\$54,900	\$77,700	\$84,700	\$75,500	\$102,800	\$120,800	\$108,200

	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74 (Estimated)
<u>Revenue Foregone through Tax Concessions, e.g.</u>								
Special depreciation allowances	-	-	?	10,000	10,000	12,000	13,000	-
Investment allowances	-	-	8,500	9,000	9,000	7,000	8,000	?
Capital expenditure allowances	-	-	8,500	10,400	10,400	10,000	15,000	
Averaging of incomes	-	-	?	30,000	30,000	22,000	?	
	-	-		\$59,400	\$59,400	\$51,000		-

Source: Budget Speech & Statements (various years)

ANTICIPATED SOCIAL CHANGES OF THE FUTURE

Dr. M. Williams,
Reader in Geography,
University of Adelaide

During the past five years, statistics have shown a steady decline in agricultural workers. However, some of this decline could be accounted for by contract labour, but we have no information in this area. On the other hand, there has been an increase in the number of tractors to the extent that at the end of 1972 there were 37,200 tractors and only 28,800 rural workers.

1. Population Distribution:

An interesting situation has developed over the past two decades with regard to the distribution of population in metropolitan, other urban and rural areas. Not only is there a relatively smaller proportion in the rural areas as the metropolitan population gets larger, but the absolute numbers are declining.

These are hard facts and I don't think we can delude ourselves that there will be any abatement of these trends in the foreseeable future. The days when more people can be put on the land are gone forever. No matter what governments do to encourage settlement intensification, the numbers will continue to fall.

For example, there is a definite end to the enlargement of irrigation areas alongside the Murray. In fact, if current thinking is followed through, not even stability will be achieved. The evaporation loss from the fresh water Lakes is often equal to, and even greater than, the withdrawals of water for irrigation and for stock, domestic and industrial uses, which are increasing. If this is so then perhaps Goolwa barrages should be abandoned and a new barrage built just up-stream of Wellington to stop salt water ingress up the River. Then irrigation farms around the Lakes will have to be supplied with piped water or abandoned.

The problem of sufficient water might get worse if the new city of Albury-Wodonga passes partially treated sewerage downstream, and more water will be needed for literally flushing out the River channel.

This is an example to show how farm population and farm numbers will not increase, and also as an illustration of the interdependence of our economy and society - what happens in the geography of one part of Australia will have an effect on another part.

2. Changes in Pinnaroo Area:

The number of holdings in the area in 1947 was 413 but by 1969 this had dropped to 347. This was voluntary aggregation of holdings and was in no way affected by the Marginal Lands Scheme. In addition, fertilisers, legumes and other innovations did not arrest this trend, but merely staved off the worst effects of enlargements.

It was evident that land was taken wherever it was available and workers were prepared to travel distances up to a 20 mile maximum. There was a conscious effort to combat decreasing incomes and to make the most efficient use of machinery. Farmers began reaping the benefit from marketing economics and buying land ahead of time so that sons could be established and thus guard against price fluctuations.

As single section holdings now became multiple section holdings farmers saw greater advantages in town dwellings which were sound financial investments. Of 166 farmers interviewed greater than 40% were not satisfied with the present size of their farms and wished to increase their holdings.

If this trend continues, we could expect to see a 20-30% drop in the number of farms in the next 10-20 years.

In fact of all these changes it can be assumed as is already apparent, that non-economic considerations in farming (personal independence, with security and tenure, social status from owning land, desire to "escape" urban living) which emphasises a "way of life" on the farm, will decline as economic considerations of making farming a paying proposition get even stronger. We will see the decline of the small family farm and the emergence of the family farm of a size in which one man can do most of the work, provided he has the labour-saving machinery and the income to employ contract labour for special jobs.

These projections are not considered to be too fanciful, after seeing what has happened during the last five years, as it would appear that the rural farm dweller does not see himself as particularly different from the city dweller in his aspirations, and expects equality of living standards and social, educational and recreational opportunities for himself and his wife and family. There are still those who are prepared to break their backs on getting a property started, but I suspect they are very few.

3. Living Areas & Basic Wage:

The Basic Wage was first formalised in the famous judgment of Mr. Justice Higgins in 1907 against the McKay Harvester Co. who were not paying wage sufficient to cover "the normal needs of the average employee regarded as a human being in a civilised community". After 1920, it was related to cost of living indexes and has been adjusted almost annually.

The concept of a "living or home maintenance" area was also enshrined in two judgments in 1901 and 1907 as follows:-

"The word "home" in our opinion, denotes the maintenance not of a bark hut or a shanty with sordid surroundings to match but a reasonably comfortable place of residence with the means of resources derived from the holding on which it stands, sufficient to maintain a wife and to bring up and educate, etc., members of an average family so as to take their place as respectable members of the community".

No formal connection between "living" wage and "living area", but at least parallel ideas. There has been some adjustment of living areas under the Marginal Lands Scheme of the 1940's and under Rural Reconstruction in the 1970's.

Perhaps, just as there is an annual revue of the Basic Wage, there should be a 2 or 5 yearly revue of the living area and the community pay for amalgamating, buying out and retraining.

But how do you cope with economic and climatic fluctuations? Perhaps there should be an "environmental margin" to equal "skill margins" of industrial workers.

THE FUTURE ROLE OF AGRICULTURAL EXTENSION IN
CONTINUING EDUCATION OF THE COMMUNITY

Dr. D.B. Williams,

Director of Roseworthy College
of Advanced Education

When taking stock of agricultural extension, the following factors have to be considered:-

- * Inflation is one of the major issues. This affects investment decisions and income distribution.
- * Education is one of the major growth industries in the economy. It is a major employer and a major source of informed people.
- * The status of the rural sector. In industrialised societies changes are very rapid. Tremendous pressure is being put on industrialised countries by under-developed countries. Markets will depend to a great extent on the purchasing power of developing countries.
- * The social costs are distinct from private or individual costs.

Agricultural extension has been given a particular identity because it has emerged from agricultural science. Factors which have given it this identity are:-

- * It has been caught up in Commonwealth-state relationships.
- * There is confusion and argument about research and extension.
- * Agricultural policy has been industry (commodity) based.
- * Primary producer organisations have used political approaches and have not understood extension.
- * Agricultural institutions are government based and programmes do not contain much on market research and agricultural policy.
- * Commerce has not co-operated.
- * Consultants are mainly interested in consulting and not education.

Roseworthy may make contributions in agricultural marketing, food processing and farmer education. Short courses will be run for farmers. These also help to keep people involved in agricultural education in contact with farmers.

Extension officers should watch the following points:-

- * Divisions between applied research, extension, etc. All sections should be working together. In some cases the best agricultural extension will be a well defined agricultural research programme.

- * Specify goals and purposes of rural people. There may be major conflicts between individual and social goals and extension officers will have to take this into account.
- * Leaders of agricultural science have let the side down. There shouldn't be a compromise on the importance of improved technology. Leaders should back improved technology.
- * They should acknowledge the work with other participants.
- * The audience must be identified.
- * Extension officers should be involved in an educational programme rather than just handing out information.

SESSION III: 3RD APRIL, 1974

CONCEPTS OF FUTURE ROLES OF OFFICERS OF THE
DEPARTMENT OF AGRICULTURE

District Agronomy Officers

G.D. Webber,
Senior Agronomist

1. Current Roles of the District Officers:

There has in the past been a tendency to look at agricultural extension work as being confined to the final communication process with farmers, and that extension was based on new information. However, extension today is accepted as being concerned with change and that people change practices, and not vice versa.

We now should see extension officers as integrators concerned with the integration of information, resources and activities to do the most good for the State's agriculture.

2. Roles or Functions of District Officers:

These aren't really divisible but for convenience we can divide the functions into three categories:-

2.1 Service role to farmers

This work which makes up a lot of the "ad hoc" service and was once seen as the whole job, is now seen as only part of the job. This service is becoming more and more sophisticated and more technically demanding as farmers are looking for the answers to the more difficult problems of production.

2.2 Educational role

This is the role which is the least recognised outside the profession, but an area which has received the most attention by extension officers themselves in the last five years.

The trend has been towards greater planning of this part of our operations. Programme planning has been introduced as a framework of planning priorities and methods in our educational effort.

2.3 Government service role

We are required to keep the Government informed on various agricultural aspects and service other Government departments and industries. Such activities include crop estimates of all crops, reports on agricultural conditions and hazards, information on current problems, fodder reserves, drought, seed supplies and potential for various crops.

Within this role is the regulatory work service to local government in such matters as weed control, where 40% of district weeds officers' time is involved directly in these activities.

2.4 Activities which make up these roles

A look at the district agronomist's work analysis shows that a fair percentage of time is spent in attending group meetings, visiting farms and attending to office visits, phone calls at the office and at home, servicing the media, planning and preparation of reports and administrative work. Regular in-service training is also undertaken to keep abreast with "change".

3. Trends That Have Brought Us to the Present Situation:

In 1971 our needs in extension were defined as:-

3.1 More extension planning

Probably the most significant objective set was that more planning of our own educational effort was required.

We saw programme planning as a system of organising work in advance, in a more formalised manner. It involved analysing situations, formulating objectives and priorities, constructing a plan of action to achieve objectives and evaluating progress.

3.2 More co-ordinated extension effort

In order to co-ordinate the district extension effort, a management system has been set up through "regional agronomist meetings" to involve all extension officers concerned in co-ordinating the extension planning operations of the Branch.

The four regions established are Eyre Peninsula, Northern, Murray Mallee, and the South East. Meetings are called at least three times a year in each region.

Recently a further development has occurred in that in each region a regional leader has been appointed to monitor the on-going activities and programmes of his region.

3.3 Increased economic considerations

The regional meeting framework has also presented a forum for training in the technical and economic aspects as required. The training programme has included small group training exercises in using the main farm management techniques. These skills have been used in bringing economic considerations into "district statements".

3.4 A more educational approach

In a similar manner emphasis has been put on a more problem-solving approach to farmer problems. Group programmes have been conducted and results evaluated at regional meetings as part of the overall planning and training process.

4. Future Roles - Future Activities:

In analysing our own extension effort, we see new problems arising - solving these problems is going to be the new basis for future roles.

4.1 Liaison with industry

If we are to provide guidance on industry trends and developments we need a thorough understanding of all aspects. There has been some progress in our liaison with the industry. It would appear we need to further improve these relationships so that industry and the Department are better informed on all issues. At present the C.I.S.G. confers with industry representatives. Future trends will see a more formalised liaison with adequate farmer, industry and Departmental representation. A similar situation exists with commerce.

4.2 Changing clientele

Farm size is increasing in the main agricultural areas. But there is another major service area that is developing. This involves the hobby and part-time farmers around major towns - a proliferation of small farms requiring service.

4.3 Intermediate audience

In looking at the demand for farm service, our activities and educational roles need some economies of effort.

There are a number of people in the general agricultural business with enormous farmer contact.

The problem exists where different people give conflicting information and this seems to be an area where more extension activity can be applied in keeping these service people informed on the latest technology. All extension services are starting to look more closely in this area.

4.4 Co-ordination of extension & research

There is a lot of confusion between "research and extension". There are far more differences between these areas than there ought to be.

We need a co-ordinated effort - a team approach to "problem solving". This is the major consideration to be undertaken in the immediate future. The answer must surely be in a "polarisation approach", i.e. while we have our research and extension roles, we must get together when looking at "problem definition, planning extension, planning research".

4.5 Direction & flexibility

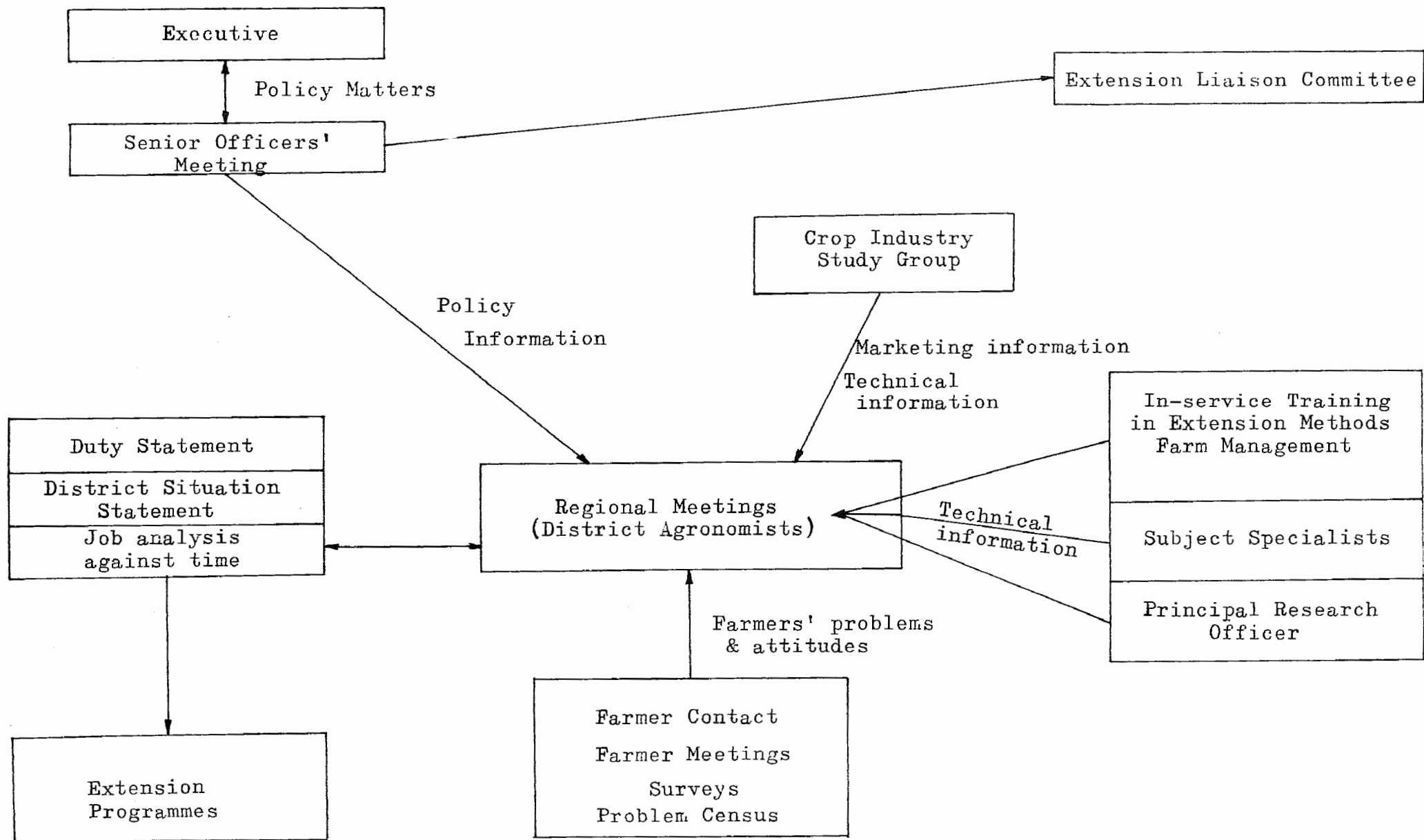
One problem we have faced in the past is lack of definition. By more co-ordinated planning we should be able to direct resources of both extension and research into the highest priority situations.

This will bring about the need for greater flexibility and will put strains on existing compartment structures in the organisation. We will have to learn to cope with these changes.

5. Conclusions:

In the era of change - extension has moved away from the fire station recipe advice stage to a more planned educational stage. This will mean:-

- * A more co-ordinated effort within the whole unit.
- * Making research and extension more relevant - establishing more realistic priorities.
- * Closer relationships with industry and commerce.
- * More flexibility of operations and more flexibility in the management within the organisation.



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CONCEPTS OF FUTURE ROLES OF OFFICERS OF THE
DEPARTMENT OF AGRICULTURE

Research Officers

E.D. Higgs,

Senior Research Officer
(Pastures)

There need be no revolutionary changes in the roles of the research officer in Agronomy Branch. The desirable changes can evolve with the minimum disruption to existing programmes of work by nothing more than a slight running down of the scale of future experimentation and a curtailment of the scope of longer term programmes, providing a clear cut plan is developed and implemented.

Changes must occur if the Department of Agriculture is to provide a first class service to the agriculture of South Australia. For the purposes of this discussion this must be done largely with the resources currently available.

The research officer is working in an organisation, some of whose members, playing a vital role, are seriously disadvantaged. The district advisers are generally poorly serviced with new and relevant old scientific information, in a form which they can grasp with limited time and effort, and which they should be using to develop district farming practices on sound lines. The research officer can help overcome this handicap endured, particularly by country advisory officers.

The research officer must, if he is to perform his current tasks effectively and with efficiency, be thoroughly conversant with all the published scientific work with a bearing on his field and should also be aware of where important work is in progress. While he has been, and is, largely employed in performing experimental work, some in association with district advisers, in future I suggest he should put a greater effort into providing district officers with easily grasped digests of the state of knowledge and likely development in selected fields with which he is familiar.

Had we sufficient numbers of research officers that all areas of expertise could be concurrently researched, the problem of keeping advisers up to date with developments would be much more easily accomplished. Unfortunately, there are many gaps between areas being researched by Agronomy Branch research officers. Unless new procedures are developed much published information of importance to South Australia will be missed.

I take a specific example in the 1972 "Agronomy Journal" to illustrate this point. Of the nearly 300 scientific contributions, in my opinion about 89 were within the areas which should be handled by Agronomy Branch officers. Approximately half of these would not have been indexed, read and considered by our present group of research officers unless they were reading well beyond their immediate field of interest.

The scale of the problem of dealing with current and accumulated literature in specific fields, which are not currently being researched by Agronomy Branch research officers, can be illustrated by my own experience of the past year in considering the literature of the legume-rhizobium symbiosis. I devoted all the time available for research in considering this subject and related ones which became apparent as I examined the most directly relevant literature, and by no means considered even half the published papers and have not as yet put any of this information in to a digest form.

There is need for more time of the senior and principal research officers of the Department of Agriculture being devoted to systematically evaluating the current relevant published work and endeavouring to catch up on the back log in neglected fields.

If the flood of literature could be effectively screened, digested and indexed, and the neglected back log likewise treated, it should be possible in future to rapidly consider the issues involved when new problems arise. It should also enable promising fields for research to be clearly defined, and so more effectively prevent emphasis being placed on what are truly unimportant issues but which cannot be seen as such in our current ignorance.

It is suggested that the Branch should plan to construct a computerised indexing and information retrieval system. While the traditional card index of individual research officers or the newer marginally punched, manually sorted card systems are useful when subjects are narrow and the number of references only run to a few hundred, they become unwieldy when the number of entries get even moderately large. I suggest that a comprehensive index for Agronomy Branch should contain at least 10,000 references now and have about 2,000 or so new entries each year.

I suggest that the research by organisations other than the South Australian Department of Agriculture is of greater value to South Australian agriculture than research conducted by our own staff. If neglected by the Department of Agriculture it has no value, or a diminished value, if the information filters into South Australia by other channels at a later date than the earliest possible.

I feel that a greater proportion of effort by research officers should be devoted to properly considering and digesting the significance of research by other bodies. This will increase the impact that these research officers have on South Australian agriculture.

Group Discussion:

HOW CAN WE BETTER SERVICE THE CHANGING NEEDS OF
THE COMMUNITY WITH OUR PRESENT RESOURCES

Format and summaries were prepared by G.K. Robinson, Senior Extension Officer and J.S. Potter, Principal Soils Officer.

It was decided to break the topic down into three categories. The first two concerned the needs of the community and the changes which were taking place. The last involved the objectives one should have when tackling such a situation.

Four points were emphasised with regard to the needs of the community.

1. Environmental:

In this area we were mainly concerned with the quality of food affected by pesticide residues.

2. Social:

Establishment and recognition of our changing clientele.

3. Technical:

Changes in land use priorities and the need for diversification.

4. Educational:

We were concerned at our ability to adapt to the changing needs of the community.

These changes we felt, fell into four categories:-

4.1 Organisational

A flexibility of staff and resource management was needed for allocation of resources for problem solving situations. Further to this, it was felt regionalisation was desirable to bridge the gap between extension and research.

4.2 Planning

The value of inter- and intra-Branch co-operation was realised, and it was agreed that a task force or team approach to specific problems was needed.

4.3 Team work

Greater liaison with commerce and industry should be established.

4.4 Training

The need for training was recognised but it was not clear what was required nor by whom.

5. Objectives:

That we should seek if we are to service the changing needs of the community with our present resources:-

- * Greater emphasis should be placed on public relations, especially after the move to Monarto.
- * There should be better communication and inter-relationship of research and extension officers, both within and between branches and industry.
- * Better problem definition is required to achieve the above two objectives.
- * Job satisfaction, as related to induction, training as allied to staff assessment, and promotional opportunity needs.
- * Greater monitoring of industry problems.
- * Selected regionalisation of groups for applied research.
- * Increase of flexibility, both between and within sections.
- * Advertise the fact that the Department has a professional service to offer.

A PRELIMINARY RESEARCH REPORT ON THE PHYTOTOXICITY
OF MANCOZEB BASED SEED DRESSINGS

Dr. A. Dube,
Senior Research Officer
(Plant Pathology)

Commercially there are two seed dressings sold with a Mancozeb base, namely Mankobunt L. and Buntosan 75M; both of these are formulated by the same company but sold through different agents. The problem of poor emergence of wheat treated with Mancozeb was observed in two areas, Tumby Bay and Upper Yorke Peninsula. However, no evidence of phytotoxicity could be found in the Technical Committee for Agricultural Chemicals' submission. Agar plate testing of Mankobunt treated wheat was done on two samples from Messrs. Bell of Maitland and Sawers of Kulpara and a reduction in germination was shown in Sawers' but not in Bell's. The lengths of roots and coleoptiles that grew from treated seed were much reduced, the effect being greatest on the coleoptiles. This test, and several others, indicated that the problem was a phytotoxic effect on emergence and not germination. A research programme was initiated because of (1) the potential size of the problem, (2) the quantities of pinched grain, (3) the use of mercurial based seed dressings until the end of March, 1973.

An extensive literature survey was undertaken on likely breakdown products of Mancozeb to ascertain the likely phytotoxic principle. It was found out that:-

- * There was very little information on Mancozeb.
- * This information indicated that Mancozeb broke down in much the same way as other ethylene bisdithiocarbamates, e.g. Nabam, Zineb and Maneb.
- * None of the breakdown products appeared to be phytotoxic except manganese, and that most reports of phytotoxicity in the literature were associated with manganese based ethylene bisdithiocarbamates.

Considerable evidence was found in the literature for phytotoxicity of manganese and also it was discovered how manganese possibly affects growth; it appears to inhibit growth hormone oxidase. When Mn^{++} and Zn^{++} analyses were done on shoots and roots from treated seed from Bell, manganese levels were three times higher in the treated when compared with the untreated.

Further factors that could aggravate the problems were:-

1. Grain Damage:

Grain damage was assessed by acid treatment of seed and a graph was presented to correlate percentage grain damage and percentage emergence. A negative correlation between the two was obtained.

2. Temperature:

It was thought that perhaps a late start to the season might aggravate the problem because of low soil temperatures. Results from experiments on temperature show that low temperatures aggravate the effect on coleoptiles. Also at lower temperatures there was a greater proportion of ungerminated seed and seed with roots only.

Future research will be on the relation between grain damage, temperature and moisture, on Mancozeb treated seed.

3. Summary:

- * A phytotoxic effect is evident with the use of Mancozeb based smuticides.
- * The problem has been found to be one of emergence, and it occurs mainly on wheat.
- * All varieties tested to date appeared susceptible.
- * It appears length of storage may play an important role.
- * From an extensive search of the literature and our own experimentation it seems that manganese could be the toxic principle.
- * Low temperatures in the field as well as soil compaction and plant pathogens, could aggravate the problem.

THE CONTROL OF STORED PRODUCT INSECTS

P.R. Birks,

Senior Research Officer
(Entomology)

In August, 1969, the Chairman of the Australian Wheat Board suggested to the Department of Primary Industry that a committee be set up to formulate extension programmes for the control of insect pests of stored grain on farms in Australia. However, it was not until September, 1970 that the Grain Infestation Expert Panel convened by C.S.I.R.O. first met. It produced a list of suggested treatments and recommended the establishment of surveys to monitor the development of resistance. However, it failed to agree on the desirability of a legislative approach to farm infestation control, and recommended a concerted extension programme. Direct monetary incentives were discussed but not supported by industry representatives.

With progress of the G.I.E.P. still in a state of turbulence the South Australian Department Agronomy Branch commenced an extension programme aimed at farm hygiene in April, 1971. From the time the extension programme was first conceived in 1969 until February, 1973 the concept had been presented to seven consecutive Standing Committees on Agriculture. The last of these, SCA 90, expressed dissatisfaction at the rate of progress; they requested a meeting of the G.I.E.P. to consider legislative control of central premises to be followed immediately by a meeting of senior administrative officers to ensure its implementation.

Two months later, the administrative officers recommended to SCA the establishment of a \$2M. inspection system of all cereal producing farms and central premises, and that legislation be established in those states where no adequate legislation occurred (South Australia and Northern Territory). They recommended SCA approach the appropriate organisation to arrive at designed standards for grain handling machinery to permit easy cleaning. SCA 91 accepted the administrative officers' recommendations and suggested financing of this scheme on the basis of 50% by the Australian Government, 25% by the Australian Wheat Growers' Federation, and 25% by state Department of Agriculture. This would have involved the appointment of 33 inspectors and ancillary staff in South Australia.

However, in August, 1973 at SCA 92, the Australian Wheat Growers' Federation rejected the above proposal on the basis that grains other than wheat were involved and should help pay, and the growers resented having to finance a system to police themselves. They indicated some support for a trace-back system, but preferred an extension approach. They sought a review after twelve months operation and required the deletion of policing. This was accepted by Australian Agricultural Council, but the Commonwealth Government refused to support a system which did not involve policing clauses, and the Australian Wheat Growers' Federation has refused to support a system without Commonwealth support. Negotiations were to proceed.

In November, 1973, the Minister of Agriculture in South Australia indicated that in view of the urgency of the farm infestation situation, we would proceed with the system of inspection associated with the agronomy advisory programme, and a detailed proposal for the appointment of a 12 man team based on a trace-back system was prepared for him. With this aim in mind, and to follow up publicity of the extension programme, it was decided that a pilot trace-back operation would be undertaken on the 1973-74 harvest deliveries at Port Adelaide.

Two hundred samples were taken, half from wheat and half from barley deliveries. Existing silo staff subdivided their normal inspection samples to provide the trace-back samples. These were incubated for eleven weeks to ensure emergence of any insect present as 1 day old eggs at the time of sampling. Sieving of samples is only three-quarters completed and so far only one sample has been detected with insects. This is a much lower return for effort than expected from previous trials here and interstate (5-10% infested). It would be nice to think that this represented an improvement in control operations on farms - regrettably I fear it probably reflects the inadequacy of sampling. Earlier trials were based on the first grain pouring from a vehicle.

These results throw some real doubt on the practicability of a trace-back system - is the effort of locating just one actual transgression worthwhile? What is one detected offence worth in publicity on "example" value?

In January of this year a draft of the "Grain and Plant Products Protection Act" was prepared and forwarded to the Parliamentary Draftsman. In essence this Act will make it an offence to hold or transport infested grain or plant produce. The person on whose premises the produce is housed may be required to take specific control measures to control some 61 different species of insects or mites which infest such produce. However, in February, 1974, SCA, AAC, the Australian Government refused to pay anything towards grain store and farm inspection. The Australian Wheat Growers' Federation refused to pay a quarter share even for one year unless the Australian Government assisted. So we were thrown back on to State resources. It was easy to predict that State Cabinet would not support the Minister of Agriculture when the Australian Government had opted out.

The net result is that we have stirred up a lot of interest, but are in danger of having no follow up. We have a draft Act which I doubt will be put forward. We have lost right of a central premises control. We have a slowly and steadily increasing resistance problem, not yet acute on farms.

REGULATORY DEVELOPMENTS - NEW LEGISLATION

J.D. McAuliffe,
Principal Agronomist

There are four important developments that have recently taken place.

1. The Weeds Act:

In July, 1972, the Minister re-appointed members of the Weeds Advisory Committee and gave the Committee the specific task of preparing a draft bill to replace the Weeds Act, 1956-69.

The Committee sought the opinion of local government and other organisations and finally submitted a draft bill - "The Pest Plants Act, 1973". When taken to Cabinet in October, 1973, the Minister was instructed to confer with the Highways Department and the Department of Environment and Conservation, because new principles included in the bill involved these Departments.

The Department of Environment and Conservation gave full support to the bill and strongly recommended that adequate finance be provided for pest plant control on roadsides.

The Highways Department agreed in principle that an authority other than the landholder should take responsibility for pest plant control on a 5 metre width on either side of the constructed carriage-way.

Highways, however, did not agree that the work and cost responsibility should be theirs and suggested that "Plant Pest Control Boards" should take the responsibility. Negotiations will commence again during the week commencing 8th April, 1974.

The Minister has agreed to release full details of the bill for discussion at the Local Government Weeds Officers' Conference, 23-24th April, 1974.

The main feature of the bill is the proposal that the Act will be administered through "Pest Plant Control Boards" composed of two or more councils and/or corporate towns. It is anticipated that approximately 20 boards will be formed, each with its own finance contributed by the member councils and by Government subsidy.

The Weeds Advisory Committee will become the "Plant Pest Commission", a statutory board granted most of the powers now held by the Minister.

The new name, Pest Plants Act, largely results from including a fourth schedule of proclaimed weeds. This schedule lists non-agricultural plants which can be community pest plants in some circumstances, e.g. within flora reserves.

2. The Agricultural Seeds Act:

A draft bill of the Seeds Act has been developed by the Seed Producers, Seed Industry Association representatives and the Departmental officers to replace the Agricultural Seeds Act, 1938-57.

It resulted from an approach by the Seed Producers' Association to the Minister of Agriculture.

Final discussions on the draft bill are yet to be held.

The draft bill includes all seed for sowing as prescribed in the regulations.

It is envisaged that the Act will be introduced in two stages.

2.1 Stage 1

The bill proposes that under the provisions of the Act:-

- * All kinds of seed for sowing as prescribed in the regulations, must be sampled and tested before being offered for sale. The analysis report related to the seed lot must be available to the buyer for inspection. In addition, all seed below set standards must be labelled with details of analysis including restricted weed seeds. The sale of seed containing prohibited noxious weeds is not allowed.
- * The use of cultivar names for other than certified seeds may be prohibited for specified kinds.
- * Seed which has been treated for disease control must be so marked.

2.2 Stage 2

An important clause which comes into effect by proclamation provides for the introduction of "truth in labelling".

- * Under this concept, all seed for sowing (as prescribed) must be labelled to give details of the analysis - physical purity, other crop and weed seed content, germination and restricted weed seeds.
- * No standards are set except that the sale of seed containing excess weed seeds by weight or prohibited noxious weed seeds cannot be sold.

In view of a recent decision of Commonwealth and state seed testing officers to recommend the introduction of "truth in labelling" legislation in all states, it may be possible to move straight into Stage 2.

The role of the Department will be to establish that the seed is truthfully labelled within defined tolerances. This will require adequate seed testing and inspectorial staff and seed testing facilities.

3. An Act to Protect Grain & Plant Products from Insect Pests:

The need for an Act of this nature arose when it was proposed to tackle the grain insect pest problem on an Australia-wide basis. About a year ago it was thought that the Commonwealth, the states and industry would subscribe to a fund of sufficient size to enable the appointment of inspectors in all states. At that time, South Australia and the Northern Territory were the only states without legislation.

A draft bill and the regulations to implement an Act have now been prepared, so we are close to being ready to carry out a programme if or when the funds can be provided.

The draft bill provides for the appointment of inspectors with the necessary powers to carry out grain insect inspections of properties. Inspectors will also have the authority to require the owner to take action if necessary.

The suggested regulations include:-

- * Prescribing measures to be taken by the owners to prevent the outbreak and spread of pests.
- * Prescribing the pests that entitle an inspector to serve notice.
- * Prescribing the measures to be taken for the control or eradication.
- * Prohibiting the sale or removal of infested grain or prescribing the conditions that must be satisfied before removal.
- * Prescribing penalties.

4. Wheat Delivery Quotas Act, 1969-73:

The Wheat Delivery Quotas Act of 1969 has now been amended three times - in 1970, 1972 and 1973. The important amendments in 1970 related to application for, composition and calculation of quotas and fixing of special quotas; the transfer of production units and to the review committee.

In 1972 amendments empowered the Committee to deal with accumulated shortfalls; the Minister to declare a season (to enable growers to be paid first advance on all wheat up to the amount of the State quota) and to allow for the receipt of hard wheat allowances.

The 1973 amendments related to the change to metric; to permit owners to request that a quota not be issued for the season; for the granting of special nominal quotas and to the transfer of quotas.

OVERSEAS DEVELOPMENTS IN AGRONOMIC CROPS

T.G. Heard,

Senior Research Officer
(Cereals)

The most interesting developments of my overseas trip were related to both variations in the technology of existing crops and to possible new crops for South Australia. In the first category we can consider most of the field crops being grown in South Australia while in the second category Triticale is the only likely contender.

Little attention was paid to cultural practices, however, the impression was gained that with the possible exception of "Spray Seed" or chemical cultivation, there is little likely change in cultural practices in the foreseeable future. Indeed, I think in the U.S.A. and Canada people I spoke to in the wheat growing areas of the mid-west and the Prairies had virtually no knowledge of this technique being used commercially.

An activity which I think should receive a lot more attention in South Australia even if only for its public relations value, is a production of pure seed supplies, particularly of cereals. It may well be that our present scheme of production of basic seed at Turretfield Research Centre, Minnipa Research Centre and Roseworthy Agricultural College is sufficient, but let's look briefly at the overseas situation. Of the countries visited the production of high quality seed and the certification of it appeared to be most advanced in England. I think this can be largely attributed to the part played by private plant breeders and seed merchants, who have to make their operations pay, while in the U.S.A. and Canada we have a situation as far as plant breeders go similar to that operating here.

The British Cereal Seed Scheme, administered by N.I.A.B., appeared to very adequately cover the basic aim of "multiplying seed under controlled conditions designed to maintain correct authenticity and high levels of health and purity". At the present time it is estimated that as much as 75% of the cereal seed sown has been bought in by farmers after passing through the certification scheme. By 1976 all cereal seed sold for seed will have to be certified.

Contrasting to this, the North American states of Kansas, Nebraska and North Dakota, plant about 8 million hectares of wheat annually. In Kansas alone last year, they had 4 million hectares of hard winter wheat, averaging $\frac{1}{2}$ tonne per hectare. Of the total 8 million hectares less than 10% is sown to certified seed. This certification requires the annual inspection of just over 16,000 hectares, compared with 50,000 of wheat inspected annually in England.

Personally I am more concerned with the initial build up of seed rather than the later certification phases, while these two operations may be combined within the one organisation, there is general agreement in the U.S.A. that they should be kept somewhat separate to ensure that the build up organisation is not responsible for the certification of its own seed.

In the States of Kansas, Nebraska and North Dakota, there are Foundation Seed Sections within the Agronomy Departments of Universities, these are in close contact with the Plant Breeding Section. There are also Crop Improvement Associations which have some connection with the Agronomy Department and the Foundation Seed Section, but generally only in that the leader of the Foundation Seed Section is on the Board of the Crop Improvement Association. The vast majority of the Board members of the Crop Improvement Association appear to be seed producer farmers. The certification of seed is the responsibility of the Crop Improvement Association and they appear to be licensed by the State to do this. In Canada we have the situation where one Crop Improvement Association, the Canadian Seed Growers' Association, carries out this job for the whole country. This could have advantages in that there should be complete uniformity of certification throughout the country, but against this, lines of communication may be long and possibly weakened.

The primary aim of the Foundation Seed Sections is to build up seed supplies as quickly as possible, bearing in mind the need to maintain purity of the seed and a reasonable cost to the buyer. Seed build up begins in co-operation with the local breeder or state university well before release of a new variety, and the aim is to have about 27 tonnes available at the time of release. Foundation seed is then sold to seed producer farmers at a relatively high price, e.g. \$370 per tonne, when the ruling commercial price is about \$92 per tonne. The capital required to set up such an operation may be a problem to us in Australia, e.g. the home base of the Nebraska unit is the 3,600 hectare Mead Research Station, of which the foundation seed section has 300-400 hectares annually for seed build up. They have 10 self-propelled headers and a seed cleaning plant which costs \$75,000.

I believe that Australia wide, possibly through the agency of the Interstate Wheat Variety Trial Committee, we should look at the possibility of closer co-operation in the build up of cereal seed. At the same time, within our own Department, more attention should be paid to this, with at least annual discussion between plant breeders and the crop agronomy group.

A further important development in wheat relates to the search for improvement in nutritional quality through higher protein content and improved amino-acid balance. This is particularly being pursued by Virgil Johnson of U.S.D.A. and his associates at Lincoln, Nebraska. In addition, wheat breeders and other centres visited are also continually on the look out for promising material. Basic work has been concerned with analysis of the world wheat collection for protein and amino-acids. At present they have been through about 17,000 varieties using 5 automatic amino-acid analysers, set up in one laboratory at Lincoln. The amount and type of equipment used is some indication of the importance assigned to this work. The work to date on the world collection indicates that variation in protein content due to genotype is greater than 5%, but variation in lysine content is only about 0.5%. There are positive correlations between lysine and some other essential amino-acids indicating that genetic increases in lysine would not be associated with significant decreases in these essential amino-acids (threonine and leucine). The varieties, Atlas 66 and Naphal, have been identified as being genetic sources of high protein. In addition Naphal posses high lysine. Progeny of these two are being examined and

initial findings are extremely hopeful. Although this wheat work is with winter types, we have here the basis for possible improvement in nutritional quality of our own spring types, and plant breeders should be aware of this.

Of the alternate crops appearing to have potential in South Australia, I believe there are two; field peas and Triticales. The crop science department of the University of Saskatchewan, is involved in a project examining the potential of a number of pulse crops with primary emphasis on field peas. Work has already been initiated on the agronomic aspects, such as time and rate of seeding, rotations and herbicide use, as well as a whole range of genetic studies. While it appears that protein content of peas is largely influenced by environmental factors, there is no evidence as to which aspects of the environment have the largest effect. In addition, there appears to be considerable genetic variability in protein content. One thousand five hundred lines from the U.S.D.A. world collection have been examined in an initial trial indicating a protein range from 15-40%. This indicates good potential for increasing protein content and already several crosses have been made between high protein lines and adapted varieties.

Finally, the second crop to have potential in South Australia is Triticale. This is an artificial genus produced by crossing wheat and rye.

The future role of Triticale is somewhat clouded and Dr. Norman Borlaug has indicated that the Triticale programme pursued by C.I.M.M.Y.T. does not aim to replace bread with a Triticale product, but to produce a new food source for developing countries. Triticales have the potential for high yield, high protein content, and a lysine content twice that of wheat. Five years ago maximum yields were of the order of 3,000 kg/ha; these are now up to 7,000-8,000 kg/ha, and under irrigation last year total yields in California reached 11,000 kg/ha. Previous problems of poor kernel development now appear to have been overcome and bushel weights of approximately 60 lb. are being obtained. The protein content of initial Triticale was 18-19%, but this is now only 12-14%, however, this is still comparable with wheat. It has been shown that bread can be produced from Triticales while some varieties have great potential for the production of forage. Triticales appear to be widely adapted, particularly to sandy situations, possibly inherited from the rye parent. Disease resistance also appears good. As a follow-up we have obtained 130 lines of Triticales for seed build up for this season.

Overall it appears that there is considerable work which we could be and should be pursuing in this Department to bring us into line with recent overseas development in agronomic crops.

OPERATIONS & ACHIEVEMENT OF THE RESEARCH

LIAISON COMMITTEE

M.R. Krause,

Principal Research Officer
(Agronomy)

At a meeting of Branch Heads held on 1st October, 1971, two new committees were formed:-

- * Research Policy Committee, composed of the Executive Heads whose brief terms of reference were to keep under review the Department's programme of research work and set priorities.
- * Research Liaison Committee, composed of the Assistant Director of Agriculture (Research & Extension) as Chairman, the principal research officers of the industry branches, and a representative of each of the Research Centres Branch, the Extension Services Branch and the Biometrics Section. Their brief terms of reference were to promote liaison between branches in matters relating to research methods and facilities and where more than one branch is involved the implementation of such research programmes.

The Research Liaison Committee had its inaugural meeting on 3rd March, 1972 and has met monthly since.

A more precise definition of the functions of the Committee were agreed upon in early meetings, and these may be summarised as follows:-

- * Be called the Research Liaison Committee (R.L.C.)
- * Encourage, implement and co-ordinate research within the Department as recommended by the Research Policy Committee and the industry branches.
- * Supervise pre-scheduling of research projects.
- * Take over the functions of the Scientific Equipment Committee (S.E.C.) which gave approval for the purchase of major scientific equipment.
- * Promote technical publication of research results.
- * Promote the practical application of research findings.
- * Make provision for suitable research facilities.
- * Examine the financial structure of research work.

1. Achievements of the R.L.C.:

1.1 The Committee has set about properly documenting research currently in progress. A publication soon to be published as "Current Research" will list all research projects current at 31st December, 1973 in a standard format.

1.2 Pre-schedules - procedures for the preparation of a pre-schedule have been adopted over a period of time and a standard format is now in use.

The system is now functional and is meeting the co-ordinating role assigned to R.L.C. After approval an abstract of a pre-schedule is filed by the Technical Secretary of the R.L.C., and this will be used to up-date the publication "Current Research" annually.

1.3 A Training and Development Scheme for research staff has been prepared after extensive investigation and discussion. It covers the training needs of graduate staff (both new appointees and the continued training of established officers) as well as diplomate staff. The final document, which is available for anyone interested, has been forwarded to the Executive for consideration, and if approved will be passed on to the Public Service Board. Further to this, there have been discussions with the Training and Development Section of the Public Service Board for a course for supervisors in staff counselling for assessment and training.

1.4 Biometry workshops

Emanating from a discussion in which the validity of the L.S.D. statistic was questioned, three workshops were organised to provide further training for selected senior officers in the philosophy and limitations of biometrical analyses.

Other matters which have or are receiving attention from the R.L.C. include the library facilities at Northfield; a review and improvement of the technical link system with research staff on research centres; studies in cost-benefit analysis in research, while a sub-committee is currently preparing a submission on "Philosophy and Objectives of Research in the Department of Agriculture".

OPERATIONS & ACHIEVEMENTS OF THE EXTENSION

LIAISON COMMITTEE

J.D. McAuliffe,
Principal Agronomist

1. Membership:

Chairman: Assistant Director of Agriculture (Mr. A.J.K. Walker)
Secretary: Mrs. Ellen Bennett
Members: Principal officers of each branch.

2. Terms of Reference:

- * To ensure proper integration of extension programmes involving more than one branch. This will include formulating extension programmes to put into effect the decisions of the Policy Committee.
- * To promote the inter-change of information and ideas on extension techniques and extension research, and where appropriate and desirable, to bring about the adoption of new techniques and procedures.
- * To keep extension programmes under review and to advise on the evaluation of programmes.
- * To make recommendations to the Executive on all aspects of the training, assessment and advancement of extension officers.
- * To make recommendations to the Executive regarding the general administration of extension activities.

3. Meetings:

The Committee met for the first time on 8th June, 1973, and has since met at approximately monthly intervals.

4. Business of Committee:

Most of the Committee's time and effort has been taken up with developing a method of officer assessment and developing, and at the same time produce criteria which will provide a basis for progression of extension officers beyond Grade I of the graduate range. We have now completed the latter part of the task and the submission is with the Director.

Another task which the Committee has almost completed is the development of a format for a Register of Extension Programmes.

Matters which will be considered in the future are officer training and development and the external journal.